

ABSTRACT OF THE DISCLOSURE

A functionalized active-nucleus complex sensor that selectively associates with one or more target species. The functionalized active-nucleus complex comprises an active-nucleus and a targeting carrier. The targeting carrier comprises a first binding region having at least a minimal transient binding of the active-nucleus to form the functionalized active-nucleus complex that produces a detectable signal when the functionalized active-nucleus complex associates with the target species and a second binding region that selectively associates with the target species. Included is a method for assaying and screening for one or a plurality of target species utilizing one or a plurality of functionalized active-nucleus complexes with at least two of the functionalized active-nucleus complexes having an attraction affinity to different corresponding target species. The method comprises the steps of functionalizing an active-nucleus, for each functionalized active-nucleus complex, by incorporating the active-nucleus into a macromolecular or molecular complex that is capable of binding one of the target species. Then bringing the macromolecular or molecular complexes into contact with the target species and detecting the occurrence of or change in a nuclear magnetic resonance signal from each of the active-nuclei in each of the functionalized active-nucleus complexes in order to either monitor the occurrence of binding between each of the functionalized active-nucleus complexes and the target species or monitor a subsequent change in the environment of the target species after the binding occurs.